1520 Signal Ltd.

Company Profile

1520 SIGNAL Ltd. OVERVIEW

1520 SIGNAL Ltd.

RZD dependent entity with a share capital spread between the following companies: JSC RZD with 36% of shares, 1520 Group of companies with 64% of shares

LICENCES

Implementation and maintenance of EBILock 950, INTERFLO 150

ESTABLISHED IN 1996

Today the company has successfully implemented:

- state-of-the-art interlocking signaling systems at more than 440 stations (10 860 points)
- 1,880 km of automatic line blocks and 500 km of lines equipped with RBTC solutions
- projects in 11 countries outside Russia - almost in each 1520 gauge country

FULL-RANGE OF SIGNALLING SOLUTIONS

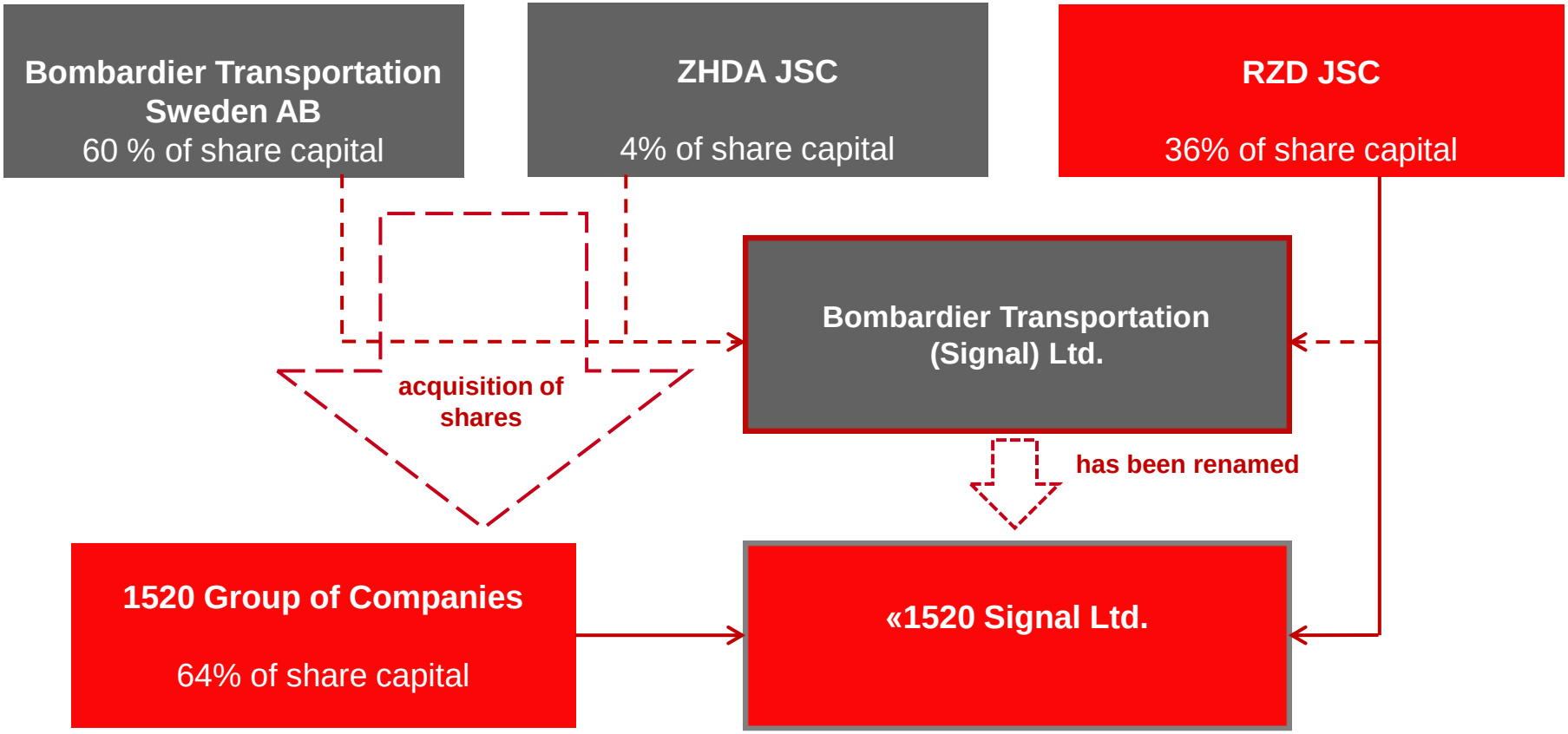
Currently 1520 Signal Ltd. is the leader in the Russian market of automatic train control systems by volume of implementation of the full-range of signaling solutions.

SERVICE CENTRES

are available in **10** cities of the Russian Federation: Moscow, Rostov-on-Don, Saratov, Yekaterinburg, Chelyabinsk, Novosibirsk, Krasnoyarsk, Irkutsk, Chita, Khabarovsk;
In **3** CIS countries and **1** service center in Mongolia

JOINT COMPANY

Bombardier Transportation (Signal) Ltd. has been renamed in 1520 Signal Ltd.



COMPANY HISTORY

1996
JV establishment (RCS 60%, JSC "RZD" 36% and JSC"Zheldoravtomatizatciya" 4%)

1999
The First CBI EBILock 950 system in Russia (Kalashnikovo station)

2000
The First automatic line block system in Russia integrated in CBI

2001
Entry to Latvia. Further rollout in Russia

2004
The First project in Lithuania

2006
The First project in Europe (Slovakia)

2007
Aksaray -Airport (Istanbul LRTS). Entry to CIS market. the First contract in Uzbekistan

2009
Th e 100-th station equipped with EBILock 950 CBI

2010
Entry to the new market - Kazakhstan. The First RBTC technology project started

2011
IRIS certification.

The First projects in Belarus and Yakutia

2012
The 200-th station equipped with CBI EBILock 950.
Best Quality Prize from RZD.
Engineering Center in the Ukraine.
Izmir (Izmir LRTS)

2013
Entry to Turkmenistan and Mongolia

The First hybrid interlocking system (Abakan)

The First Azerbaijan project

2014
2 RBTC lines in Kazakhstan.The new contract in Kazakhstan (over 1200 km).

2015
Winner of the tender together with ELTEZA 1111 km

Contract with Turkmenistan for the Bereket-Etrek line

ETCS trail operation Level 3 in Great Britain

2016
The First implementation of the cybersecurity system. Entry to Serbia (Resnik-Valevo)

The Moscow Central Circle was launched

2017
The First mass-transit project in Moscow metro

BHP project in Australia (iron stone)

2018
The project in Azerbaijan

The project in Uzbekistan.

Over 400 stations are in commercial operation under EBILock 950

2019
Mongolian project fulfillment - 1111km of RBTC system.

15 January - the company changed its name into 1520 Signal Ltd.

2020
Rudnevo electric depo was commissioned in the Moscow Metro.

Winner of the Moscow Mayor competition «The Best Project Realized»







GLOBAL MARKETS OF THE 1520 SIGNALING DIVISION

SIGNALING SYSTEMS IMPLEMENTATION GEOGRAPHY

Country	Stations	Points	RBTS (km)
Azerbaijan	21	580	300
Belarus	1	71	0
Kazakhstan	71	952	1600
Latvia	34	842	226,6
Lithuania	14	243	200
Mongolia	4	18	1100
Turkmenistan	24	215	628,5
Turkey	38	105	78
Slovakia	3	87	0
Serbia	10	47	78
Great Britain	2	10	6
Uzbekistan	30	541	140
Ukraine	7	79	105,8
Australia	36	350	500
Russia	246	7550	688,8

IMPORTANT INTERNATIONAL PROJECTS

MODERN TECHNOLOGIES FOR TRAIN CONTROL:

- ✓ **Kazakhstan**: signaling and radio traffic control systems for the railway corridors Uzen – Bolashak, Arkalyk – Shubarkol, Zhezkazgan – Beineu (> 1200 km)
- ✓ **Uzbekistan**: signaling and communication railway systems of the Marakand – Karshi – Kumkurgan-Ketab – Termez line (> 450 km)
- ✓ **Turkmenistan**: signaling systems of the Chilmammet – Buzkhun and Bereket – Etrek lines as well as railway infrastructure of the port of Turkmenbashi
- ✓ **Mongolia:** equipping the Trans-Mongolian railway (UBZhD) with signaling and train control systems via the radio channel (> 1100 km)
- ✓ **Azerbaijan**: signaling and communication systems of the Boyuk – Kesik – Ujar section
- ✓ **Latvia:** railway signaling systems of the Skriveri – Krustpils section, st. Bolderaja
- ✓ **Lithuania:** signaling systems of the Kaishadoris – Radviliskis line and of the Kalvariya and Kena stations
- ✓ **Ukraine**: signaling and communication systems of the Krasnograd – Lozovaya line
- ✓ **Belarus:** CBI equipment at the Barbarov station
- ✓ **Slovakia:** signaling equipment of the Chadca – Skalite section
- ✓ **Serbia**: modernization of signaling and communication systems of the Reznik – Valjevo section
- ✓ **Turkey:** design of signaling systems for the city transport system of Izmir (cooperation with Bombardier)
- ✓ **UK:** Engineering for the project of ETCS L3 technology Implementation (cooperation with Bombardier)
- ✓ **Australia:** Engineering for BHP project - implementation of ETCS L3 technology (cooperation with Bombardier)

CBI SYSTEMS IMPLEMENTATION IN RUSSIA

1520 SIGNAL

246 STATIONS

7 550 POINTS

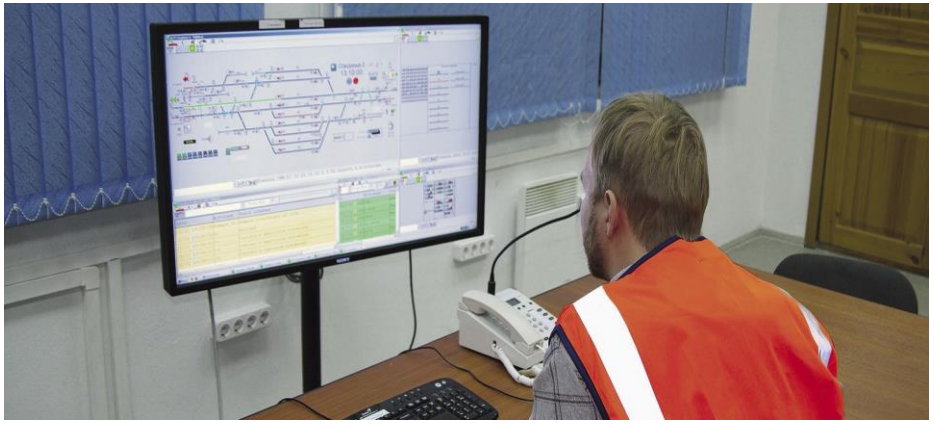
688,8 KM OF LINE-BLOCK

PROJECTS OF CRUCIAL IMPORTANCE IN RUSSIA:

FROM DESIGN TO CONSTRUCTION, OPERATION AND MAINTENANCE

- ✓ **Modernization of the Russian Railways Network** (the planned program over 20 years, > 200 stations and open lines)
- ✓ **Modernization of the Eastern Polygon of the Russian Federation** (BAM and TRANSSIB) – the main lines of the country (> 10,000 km)
- ✓ **Komsomolsk-on-Amur** – **Sovetskaya Gavan** – the line reconstruction
- ✓ **Ussuriysk** – **Nakhodka** – railway infrastructure development
- ✓ **Ukraine Bypass** – construction and equipping of a new line Zhuravka – Millerovo
- ✓ **Mezhdurechensk** – **Taishet** – overall integrated development of the railway line
- ✓ **Olympic Games 2014 in Sochi** – construction and equipping of the transport infrastructure facilities
- ✓ **Moscow Central Circle (MCC)** – reconstruction and modernization for optimization of the passenger traffic
- ✓ **Moscow Central Diameters (MCD)** – reconstruction and modernization for optimization of the passenger traffic
- ✓ **Moscow Metro Depots** - signaling systems (Solntsevo depot, Rudnevo depot)
- ✓ **Koltsevaya (Circle) and Filyovskaya Metro Lines** – signaling systems

MAINTENENCE AND TRAINING ROOMS



MULTILEVEL SYSTEM OF TECHNICAL SUPPORT

- a multi-level maintenance system takes into consideration the customers' interests, the maintenance capabilities of the company and the required level of operational capability of the computer-based equipment.
- a network of the regional service-centers

Training rooms, courses and programs

- Training of the railroad staff
- Cooperation with field-specific institutions

Training institutions

- MIIT, the Andreev and Irkut railway colleges, the Moscow Railway, Republic Sakha Yakutia

Classes in the training room with the EBILock 950 computer-based interlocking in the MIIT

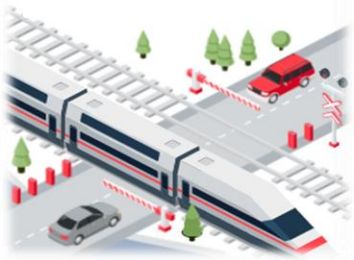
SERVICE CENTERS GEOGRAPHY of 1520 SIGNAL Ltd.

14 service centers on the 1520 gauge

- Russia – 10
- CIS – 3
- Mongolia – 1

PRODUCTS AND SOLUTIONS OF 1520 SIGNAL Ltd.

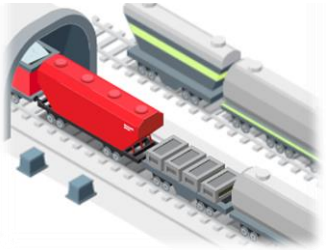
Mainlines



Very High Speed Lines

Mass -Transit

Industrial Transport



Technical solutions for mainlines, high speed and very high speed lines of the mass transit and industrial transport are realized via the following components, manufactured with respect to the Customer demands:

Centralized Traffic Control (CTC)

Radio Block Center (RBC)

Central Processing Unit (CPU)

Level Crossings

Point Machines

Track Circuits

Onboard Systems

Object Controller System

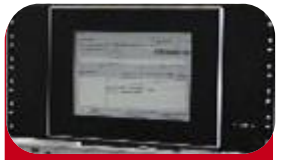
Object Controller RUVIO

Lightening protection

Signals

End of the Train Device (TIMS)

Balises



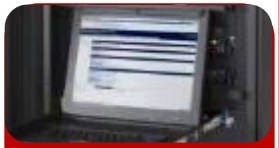
Cybersecurity

Axle Counters

MAINLINES AND VHS LINES SIGNALLING SOLUTIONS OVERVIEW

HIS-E


Centralized Traffic Control (CTC)


Central processing Units (CPU)


RUVIO Object Controllers


Existing Hybrid Interlocking System (HIS)

- Increased safety on the railway due to optimizing the flow of trains with usage of centralized traffic control and central processing unit;
- Overlay of the existing hybrid interlocking system in case of high-flexibility;
- Archiving all commands/alarms/actions of workforce for quick data analysis;
- Extended self-diagnostic system, which can predict failures of all subsystems;
- Decreasing number of relay equipment which gives an advantage in saving space in control and server rooms.

MPC-E


Centralized Traffic Control (CTC)


Central Processing Units (CPU)


Object Controller System


Axle Counters or Track Circuits

- Archiving all commands/alarms/actions of workforce for quick data analysis;
- Integration with lines between stations for an efficient dispatching control and operation on the railway line;
- Usage of highly innovative signaling technologies on the railway;
- Complex cybersecurity system for incidents detecting, data archiving and operational staff notifying;
- Extended number of technological functions depending on the requirements for the system;
- Extended self-diagnostic system, which can predict failures of all subsystems.

RBTC system


Centralized Traffic Control (CTC)


Central Processing Units (CPU)


Object Controller System


Radio Block Center (RBC)


Balises


End of Train Detection


Axle Counters or Track Circuits


Onboard Safety Systems

- Possibility to arrange unequipped trains operation without considerable effect on the line capacity;
- Possibility to use the RBTC system as a main or back-up system for lines with any signaling infrastructure.

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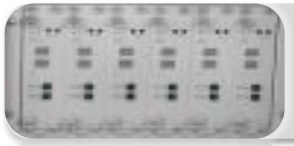
Metro and Light Rail Transport Systems

Central Traffic Control

Dispatching center

Central Processing Unit (CPU)

Object Controller System



Track Circuits and Automatic Speed Control Generators

Point machines

Signals

Points
Signals
Wayside equipment

The architecture of computer-based interlocking:

- has fully micro-processing system starting from interlocking processing unit till object controller system;
- has extended self-diagnostic system, which can predict failures of all subsystems;
- has transmission from regular scheduled maintenance to maintenance “when required”;
- has full redundancy, if failure of the main system occurs it guarantees transmission to the reserve;
- has integrated overvoltage protection system;
- under the Client’s requirement architecture can be built with:
  - hot standby redundancy;
  - with specific redundant subsystems;
  - without redundancy.

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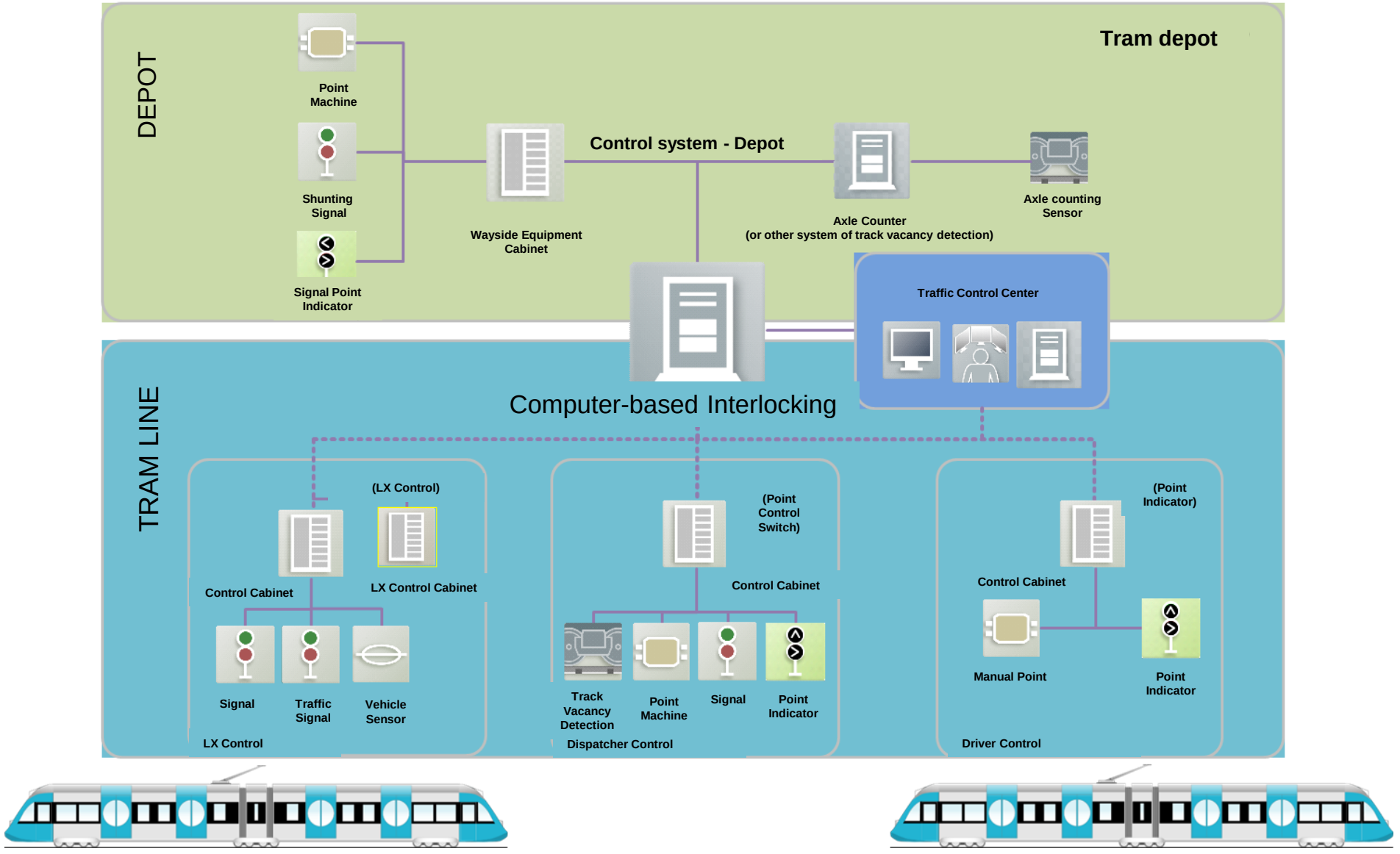
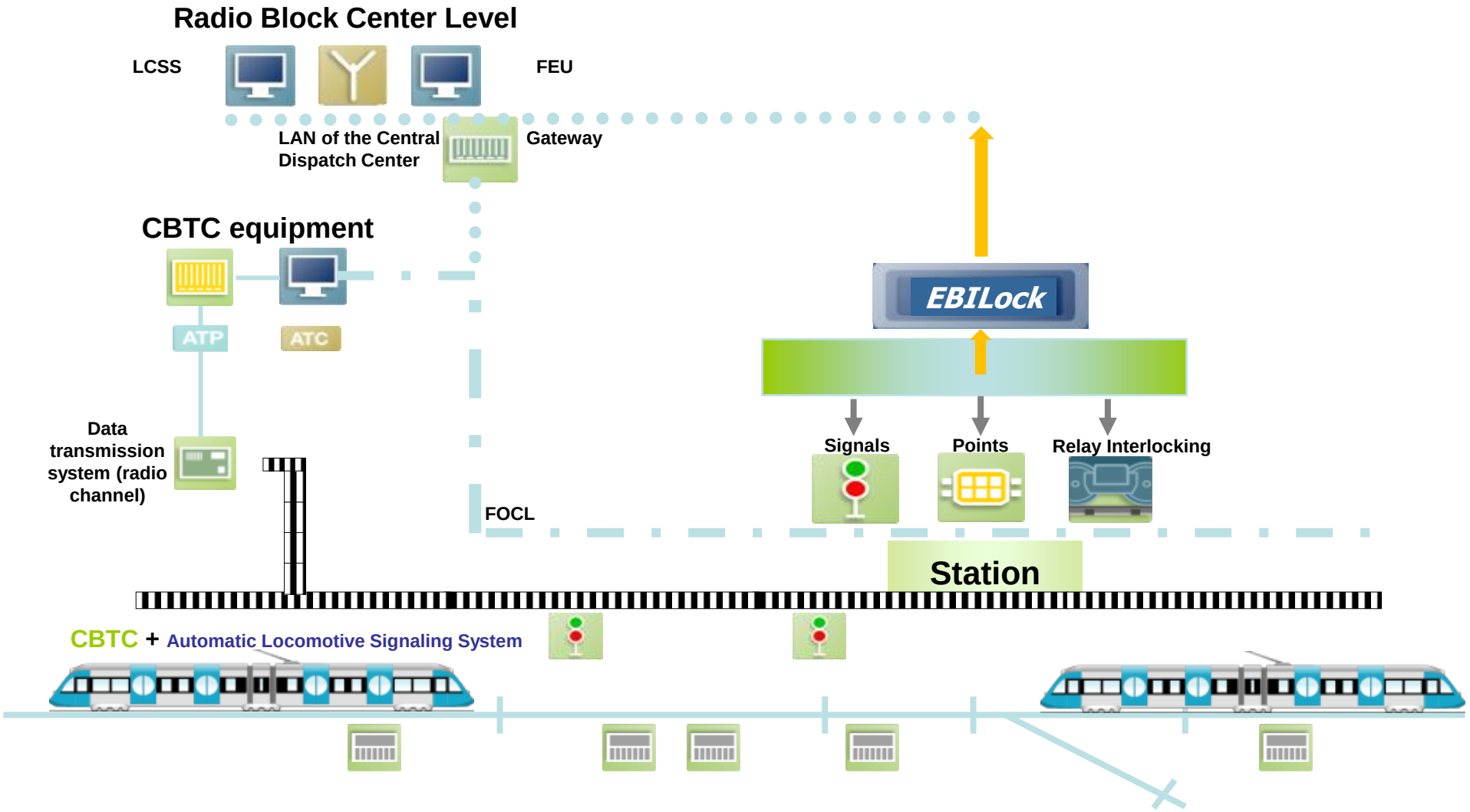
SOLUTION FOR TRAM SYSTEMS



SOLUTIONS FOR LIGHT RAIL TRANSPORT

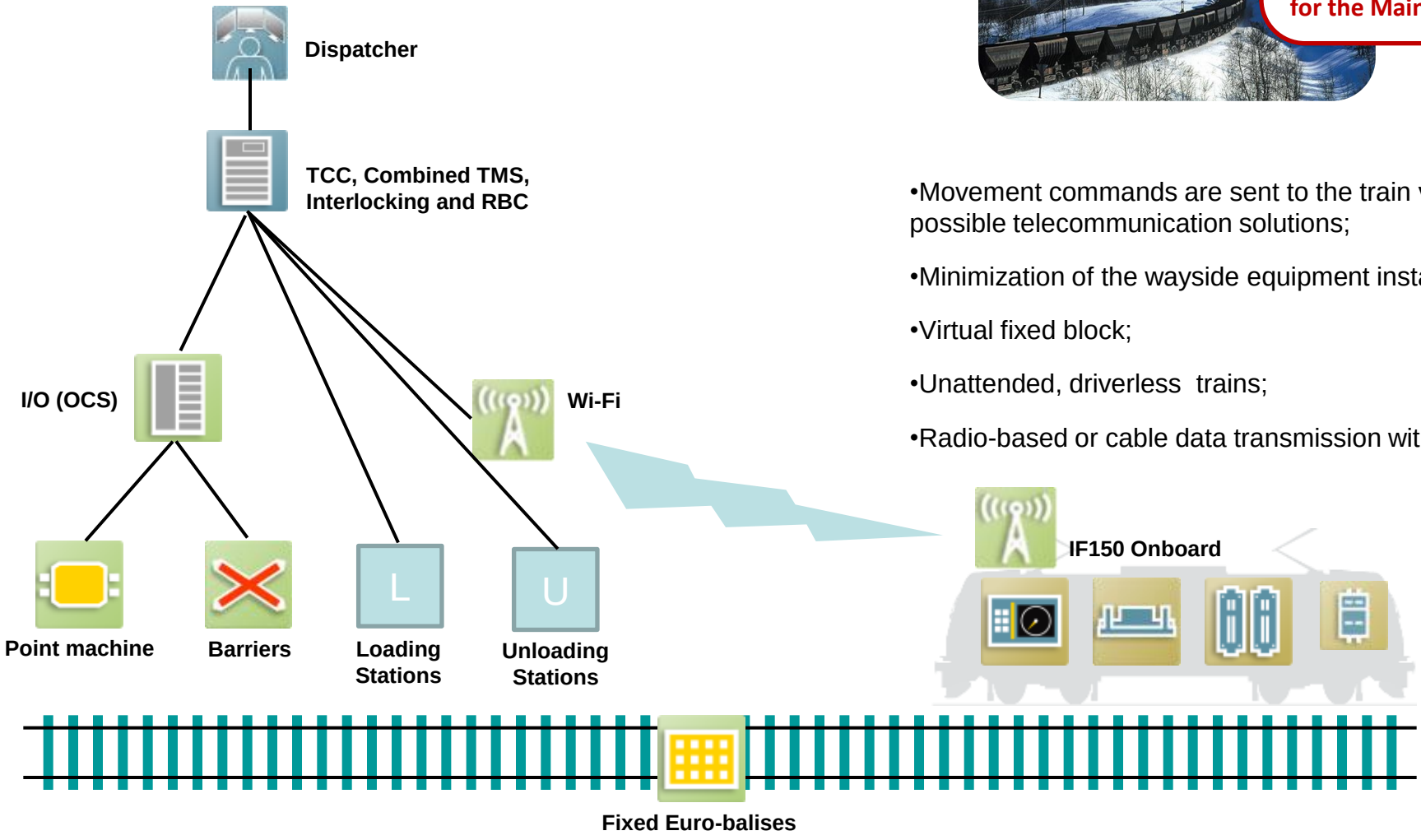


*LCSS– local control supervisory system of the central dispatcher center; ATP – Automatic Train Protection; FOCL – fiber-optic link;
LAN – local network of the central dispatcher center; ATC – Automatic Train Control; CBTC – Communications-Based Train Control; EBILock – Bombardier Transportation's trademark.

INDUSTRIAL SIGNALING SOLUTIONS OVERVIEW

Signaling Solution for underground transportation:

Overground Signaling Solutions are the same as for the Mainlines



- Movement commands are sent to the train via Wi-Fi or other possible telecommunication solutions;
- Minimization of the wayside equipment installation;
- Virtual fixed block;
- Unattended, driverless trains;
- Radio-based or cable data transmission with object controllers.

STRATEGIC PARTNER OF YOUR RAILWAYS

1520 Signal has pioneered in many areas and continues to enter and develop railway signaling markets:

- ✓ Full range of Products including highly efficient and technological Computer-based interlocking, Computer-based line block system, Radio-based train control systems;
- ✓ Over 200 stations implemented across Russia and over 400 in total at 1520 area – huge experience of implementation, daily support, integration with existing rail infrastructure systems and increasing CBI functionality;
- ✓ Organization of 24/7 technical support and service centers network, training rooms and programs, cooperation with railroad universities and colleges;
- ✓ Solutions on gradual and partial modernization of existing interlocking;
- ✓ Complex protection from atmospheric and mutation overvoltages;
- ✓ Railway certifications, incl. IRIS;
- ✓ Cybersecurity and other innovative components for the signaling system.

TECHNOLOGY PARTNERS OF 1520 SIGNAL Ltd.

1520 SIGNAL

BOMBARDIER

SIEMENS

FRAUSCHER

PHOENIX CONTACT

hakel

CISCO

РОСЖЕЛДОР ПРОЕКТ

МЦСТ ЭЛЬБРУС

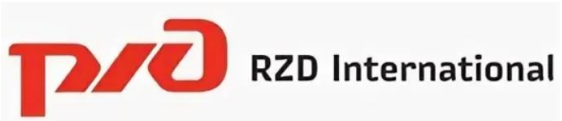
РЖД НИИАС

RIKA

DEHN

CUSTOMERS OF 1520 SIGNAL Ltd.

1520 SIGNAL



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THANK YOU FOR YOUR ATTENTION!